



TAOGLAS®



Datasheet

Part No:
DSGP254B

Description

GPS L1 / GALILEO E1 / BEIDOU B1C 1575.42MHz SMD Ceramic Patch Antenna

Features:

SMD Mount Ceramic Patch Antenna
GPS L1 / GALILEO E1 / BEIDOU B1C 1575.42 MHz
Includes Additional Solder Mask
Dimensions: 25 x 25 x 4mm
RoHS & Reach Compliant

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1. Introduction



The DSGP254B is a compact ceramic GPS L1 / GALILEO E1 / BEIDOU B1C 1575.42 MHz passive patch antenna, measuring just 15mm x 15mm with a low-profile height of 4mm. Its small form factor makes it ideal for space-constrained applications such as compact telematics devices, vehicle tracking and fleet management systems, wearables, and navigation devices.

The antenna is optimized for a 50mm x 50mm ground plane, operating at 1575.42 MHz with a peak gain of 2.56dBi. Designed for SMT mounting, the ceramic patch includes an additional solder mask to enhance durability and prevent cracking due to heat expansion during high-volume, cost-sensitive assembly processes.

Typical applications include:

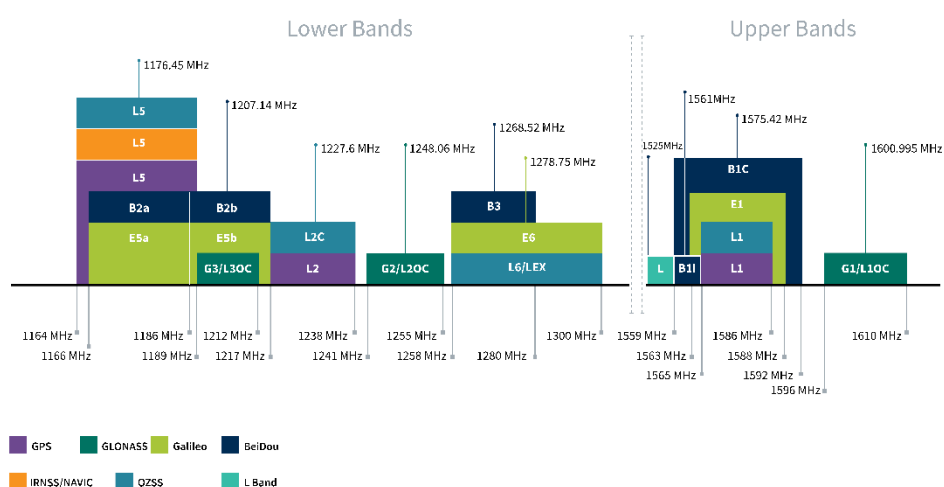
- Vehicle Tracking and Fleet Management Systems
- Wearables
- Navigation Devices

The DSGP Series can be manufactured in a TS16949 first-tier automotive-approved facility and tested to AEC-Q200 certification if required. Further to this, full PPAP and IMDS documentation can be provided upon request. Please discuss your quality and reliability requirements with our team prior to ordering.

Taoglas also offers custom tuning services based on minimum order quantities, contact your regional Taoglas customer support team for further information.

2. Specification

GNSS Frequency Bands					
GPS	L1 1575.42 MHz	L2 1227.6 MHz	L5 1176.45 MHz		
	■	□	□		
GLONASS	G1 1602 MHz	G2 1248 MHz	G3 1207 MHz		
	□	□	□		
Galileo	E1 1575.24 MHz	E5a 1176.45 MHz	E5b 1201.5 MHz	E6 1278.75 MHz	
	■	□	□	□	
BeiDou	B1C 1575.42 MHz	B1I 1561 MHz	B2a 1176.45 MHz	B2b 1207.14 MHz	B3 1268.52 MHz
	■	□	□	□	□
L-Band	L-Band 1542 MHz				
	□				
QZSS (Regional)	L1 1575.42 MHz	L2C 1227.6 MHz	L5 1176.45 MHz	L6 1278.75e6	
	■	□	□	□	
IRNSS (Regional)	L5 1176.45 MHz				
	□				
SBAS	L1/E1/B1 1575.42 MHz	L5/B2a/E5a 1176.45 MHz	G1 1602 MHz	G2 1248 MHz	G3 1207 MHz
	■	□	□	□	□



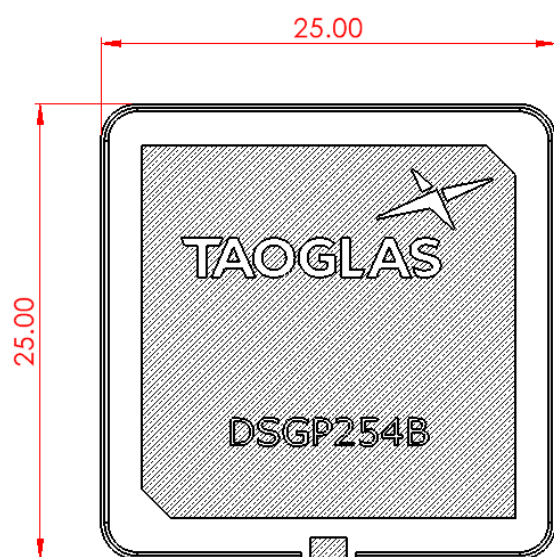
GNSS Bands and Constellations

GNSS Electrical	
Frequency (MHz)	L1/E1/B1C (1575.42MHz)
	1565-1586
Efficiency (%)	61.8
Average Gain (dB)	-2.09
Peak Gain (dBi)	2.56
Axial Ratio (dB)	1.59
Polarization	RHCP
Impedance	50 Ω

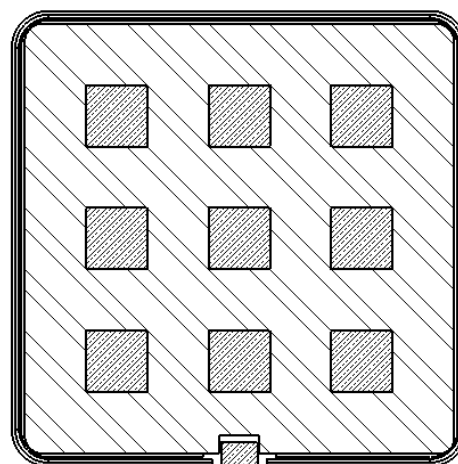
Mechanical	
Dimensions	25mm x 25mm x 4 mm
Weight	10g $\pm$ 3%
Material	Ceramic

Environmental	
Operation Temperature	-40°C to 85°C
Storage Temperature	-40°C to 85°C
Relative Humidity	Non-condensing 65°C 95% RH
Moisture Sensitivity	3 (168 Hours)

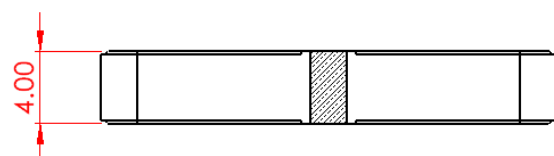
3. Mechanical Drawing



TOP



BOTTOM



SIDE

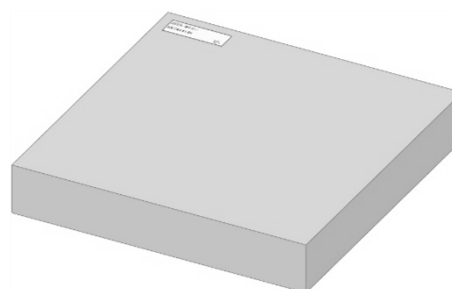


4. Packaging

200 pcs/ Reel/ Vacuum bag



200 pcs / Box
Box: 350x340x67mm
Weight: 2.6 ±3% Kg

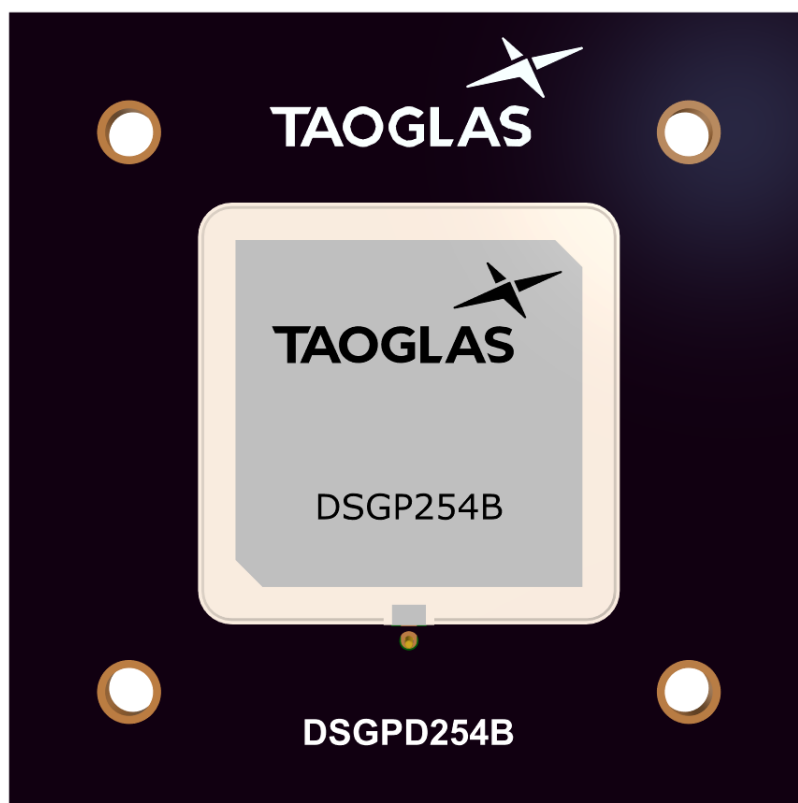


800 pcs / Carton
Carton: 370x370x300mm
Weight: 11.2 ±3% Kg



5. Antenna Integration Guide

The following is an example on how to integrate the DSGP254B into a design. This antenna has 10 pins, where one pin is used for the RF Feed. Taoglas recommends using a minimum of 50x50mm ground plane (PCB) to ensure optimal performance.



Top view of PCB reference design.

5.1 Schematic and Symbol Definition



Above is a 3D model of the DSGP254B on a PCB reference design.

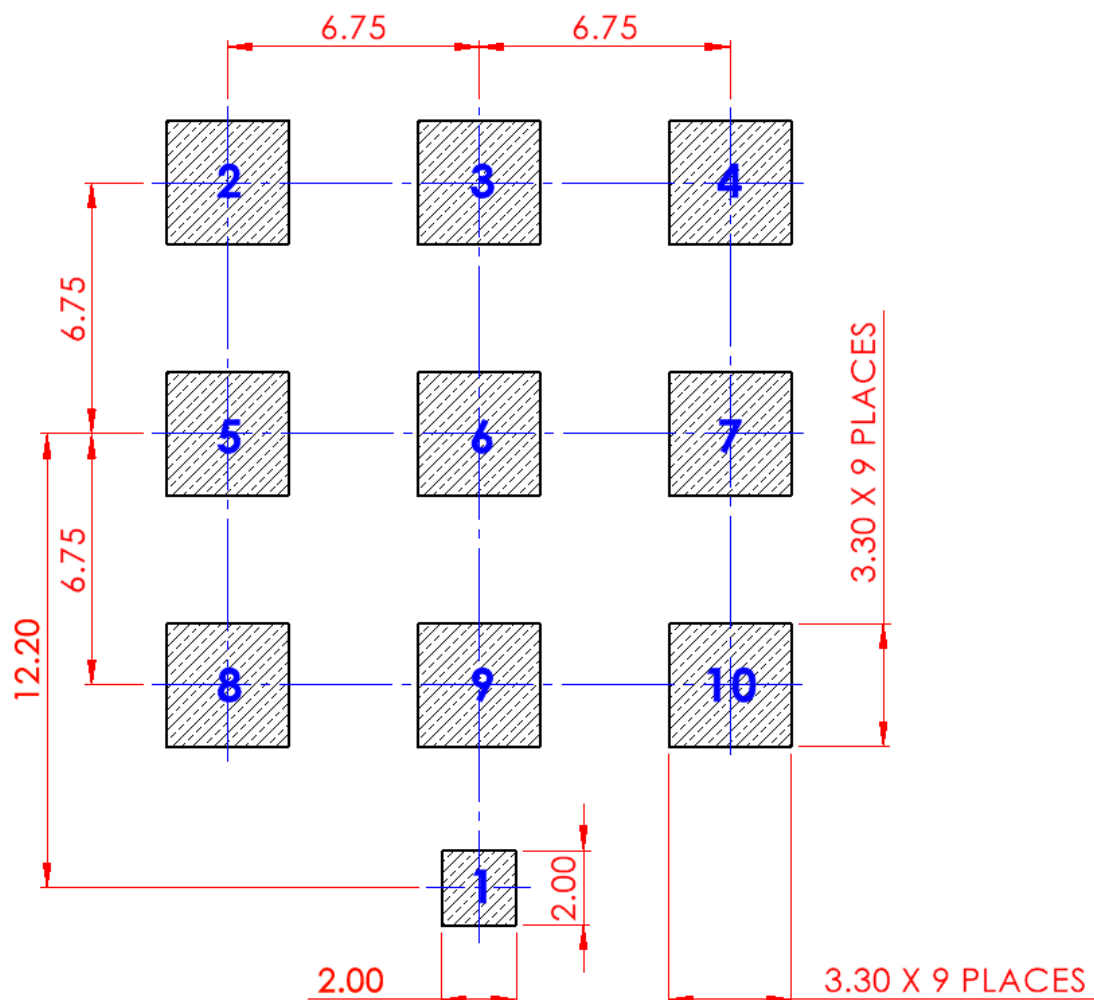
The circuit symbol for the DSGP254B is shown below. The antenna has 10 pins as indicated below.

TAOGLAS_DSGP254B
ANTI

Pin	Description
1	RF Feed
2-10	Ground

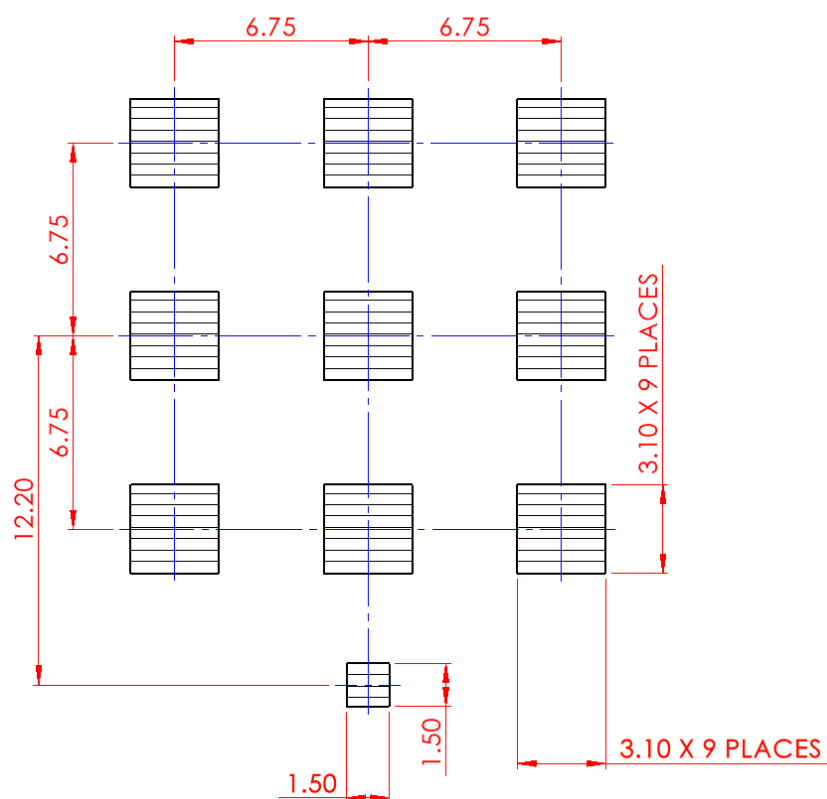
The circuit symbol is a yellow rectangle with a red border. Inside, there is a blue antenna symbol connected to pin 1. Pins 2 through 10 are labeled 'GND'.

5.2 Antenna Footprint

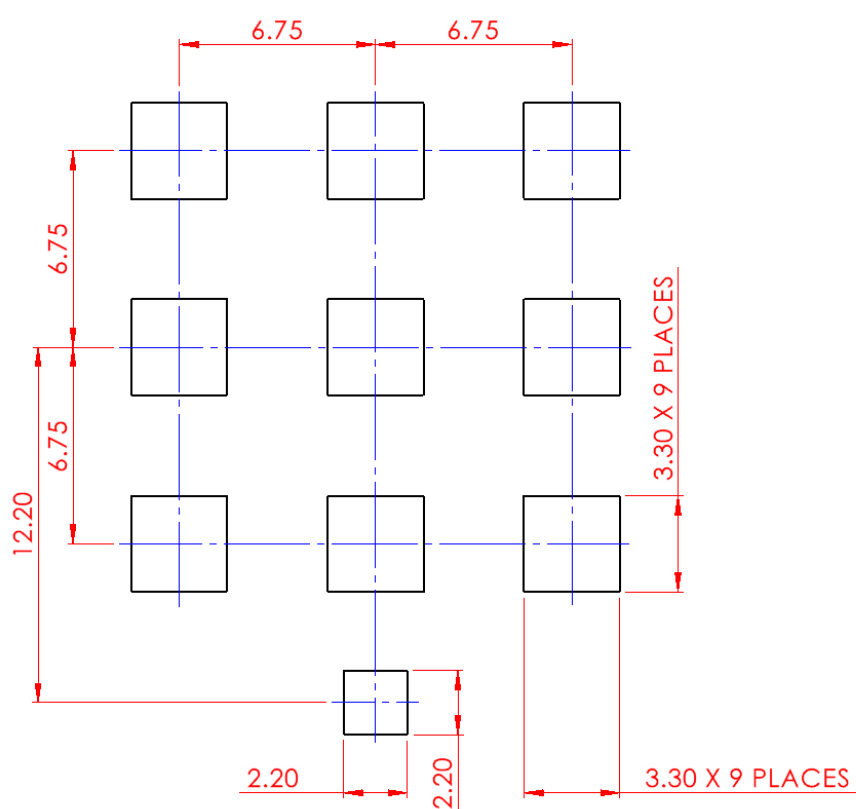


Pin	Description
1	RF Feed
2-10	Ground

5.3 Top Solder Paste



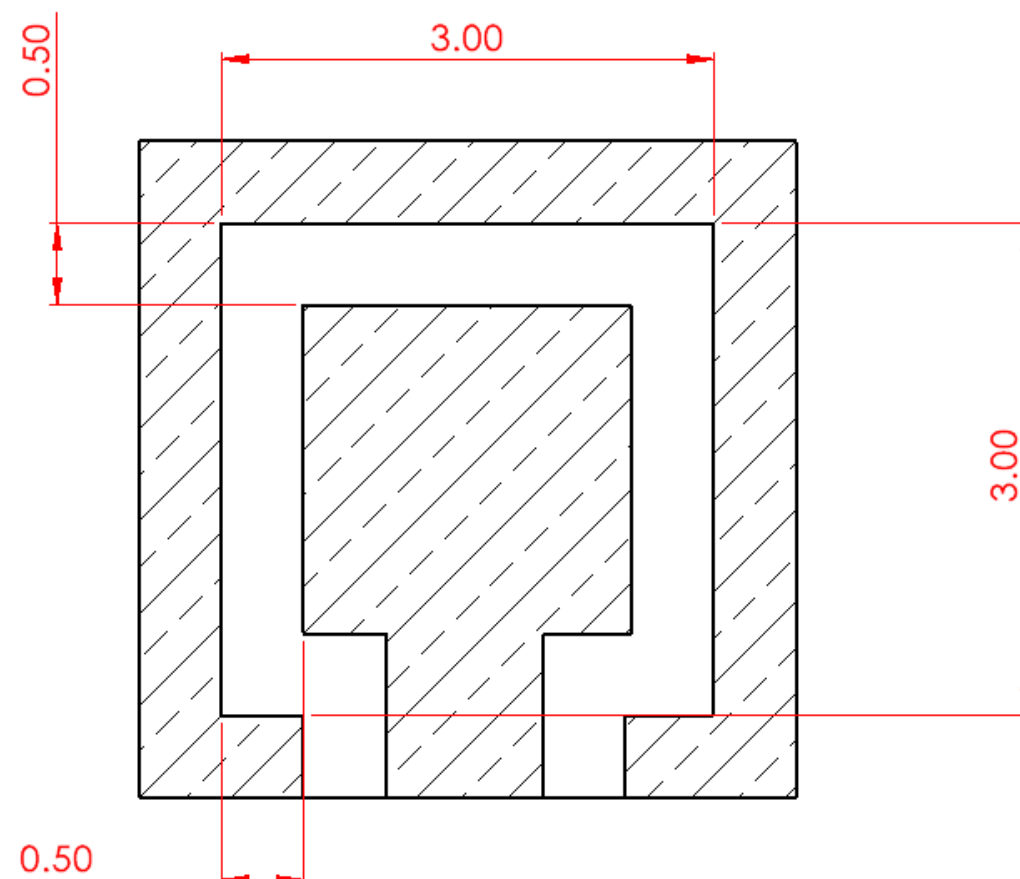
5.4 Top Solder Mask



5.5 Copper Clearance for DSGP254B

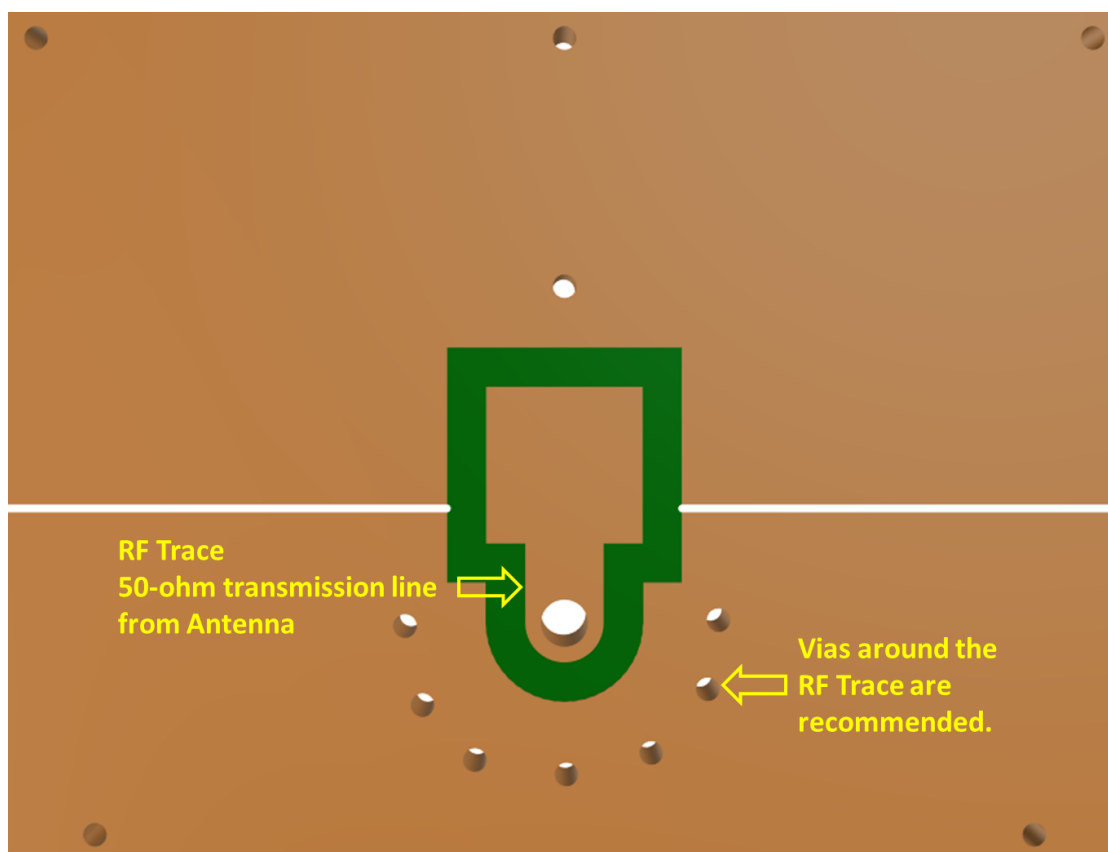
The footprint and clearance on the PCB must comply with the antenna's specification. The PCB layout shown in the diagrams below demonstrates the DSGP254B clearance area. The copper keep out area only applies to the top layer.

There should be a 3mm copper clearance area around RF Feed pad.



5.6 Antenna Integration

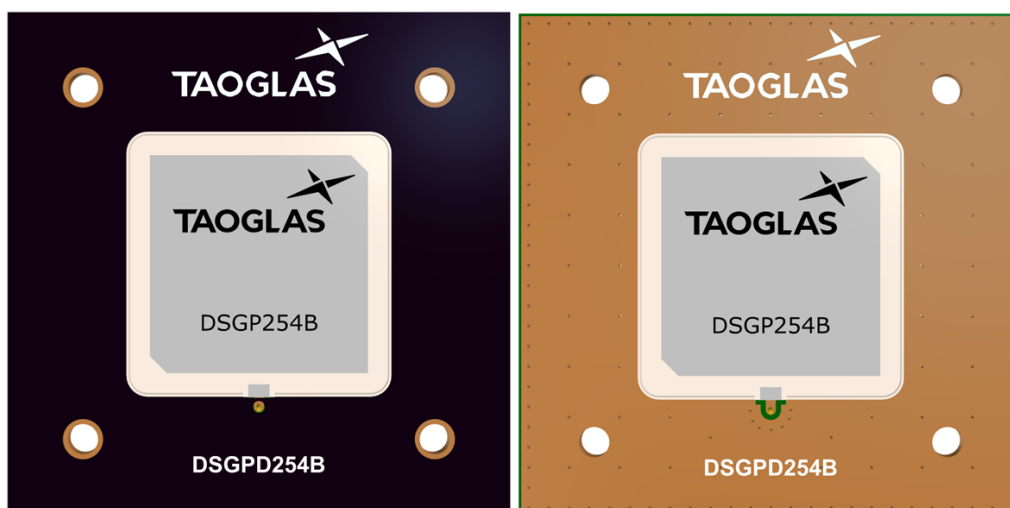
The DSGP254B should be placed in the centre, as close to the edge on the long side of the PCB as possible, to take advantage of the ground plane. The RF trace must maintain a 50 Ohm transmission line. Ground vias should be placed around the RF trace.



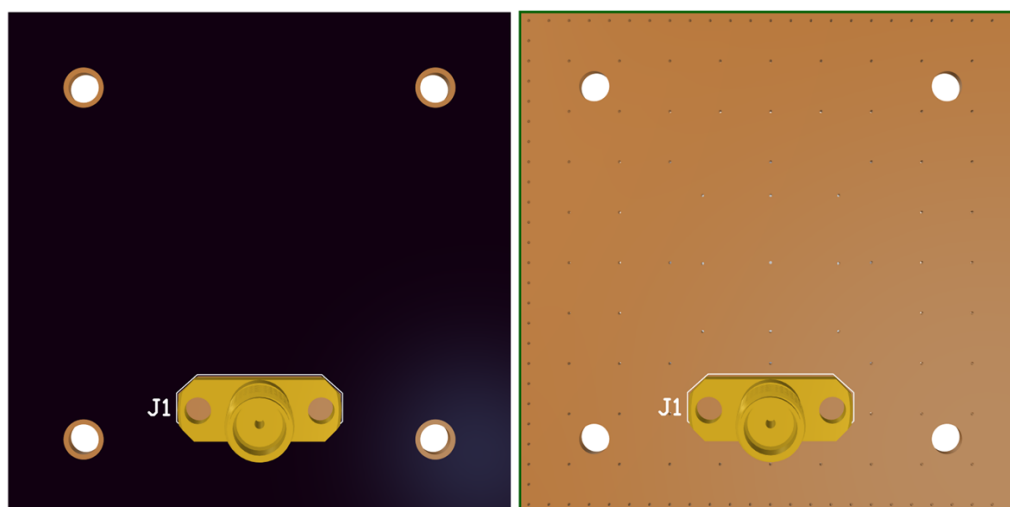
DSGP254B antenna mounted on a PCB reference design, showing transmission lines and integration notes.

5.7 Final Integration

The top side image shown below highlights the antenna transmission line. Taoglas recommends using a minimum of 50x50mm ground plane (PCB) to ensure optimal performance.



Top Side (DSGP254B placement on 50x50mm PCB reference design)



Bottom Side

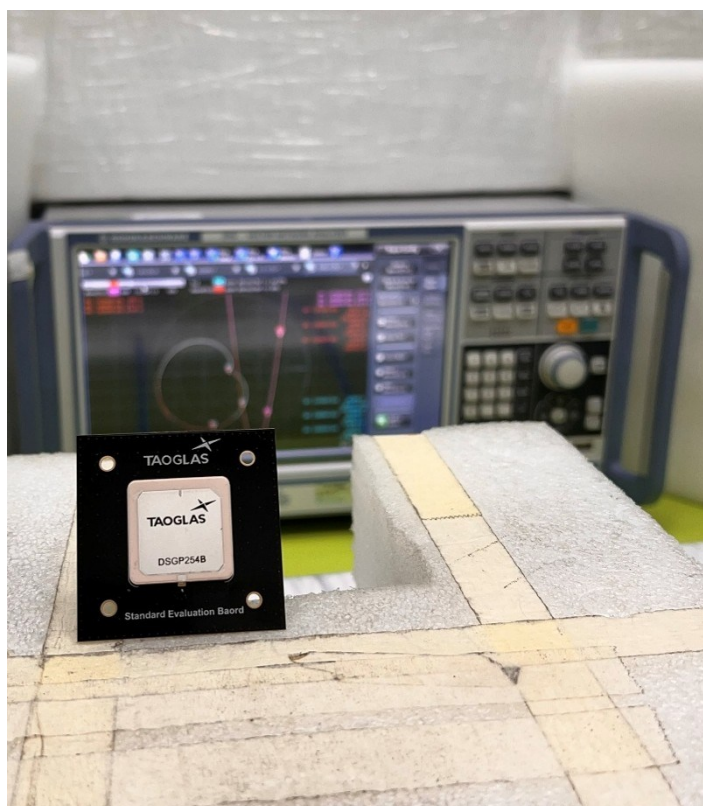
6. Antenna Characteristics

6.1 Test Setup

AUT

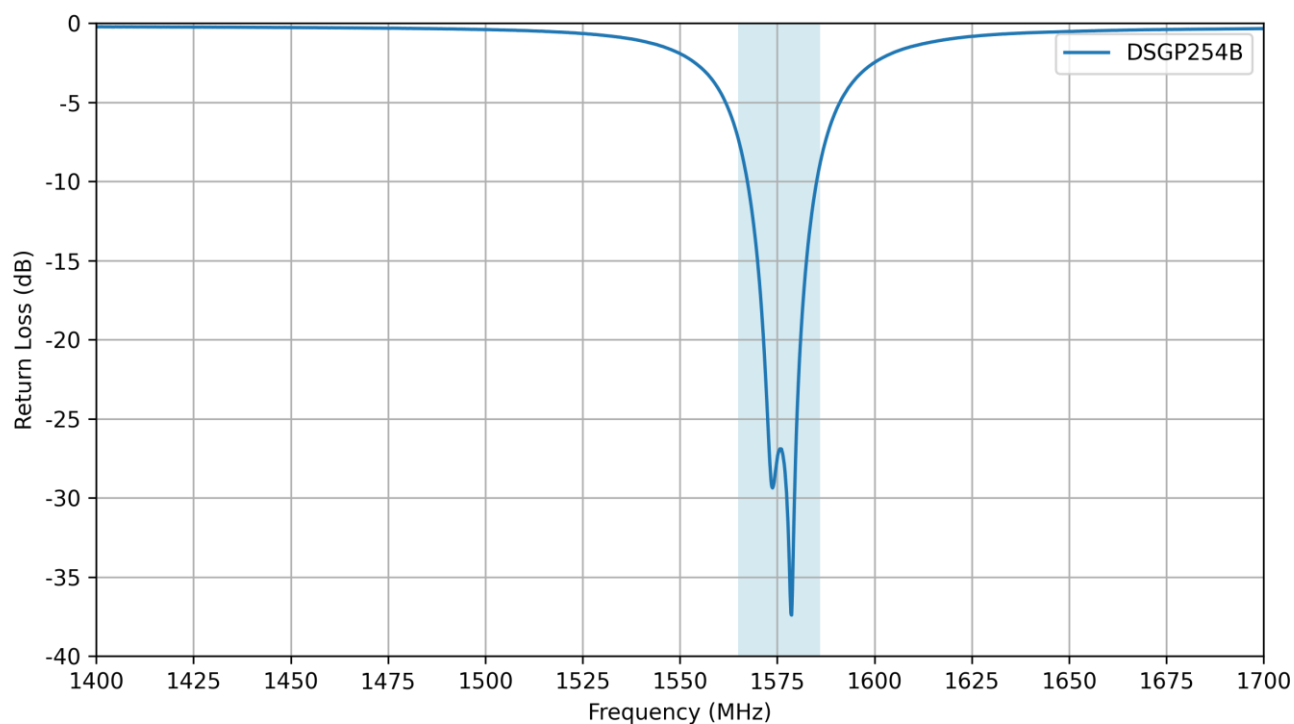


Vector Network Analyzer

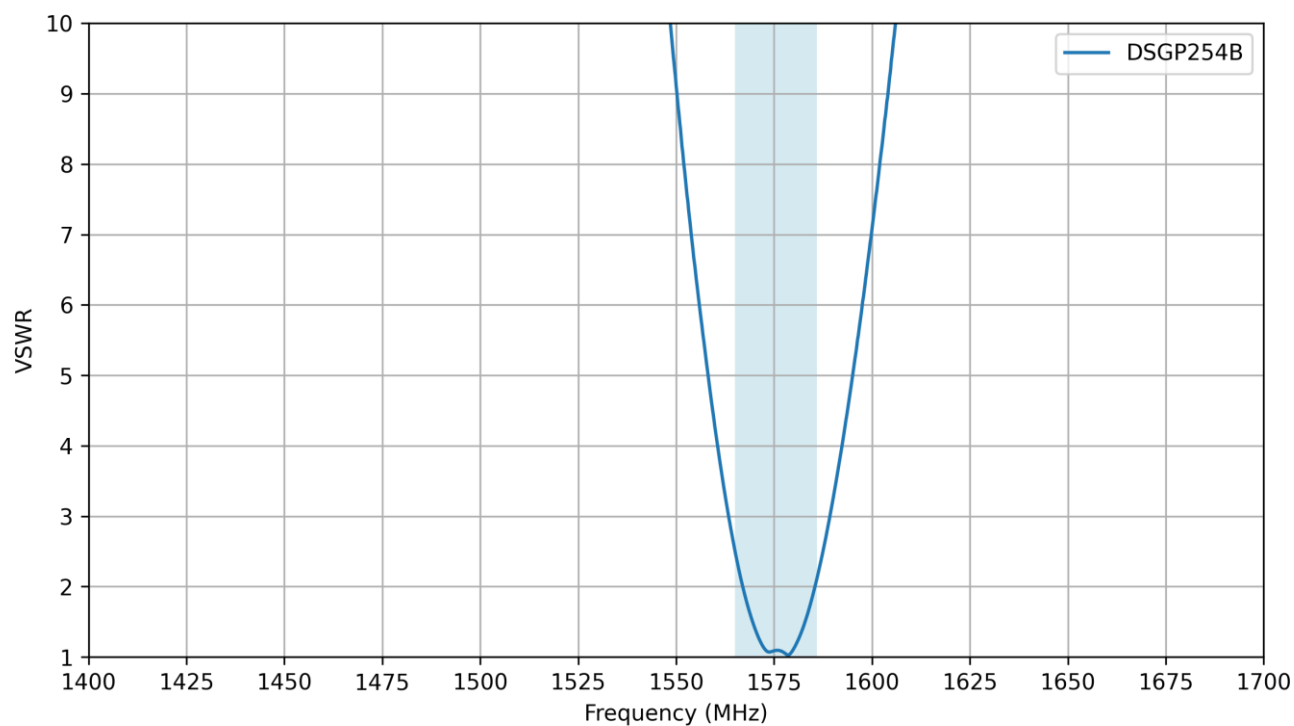


VNA Test Set-up

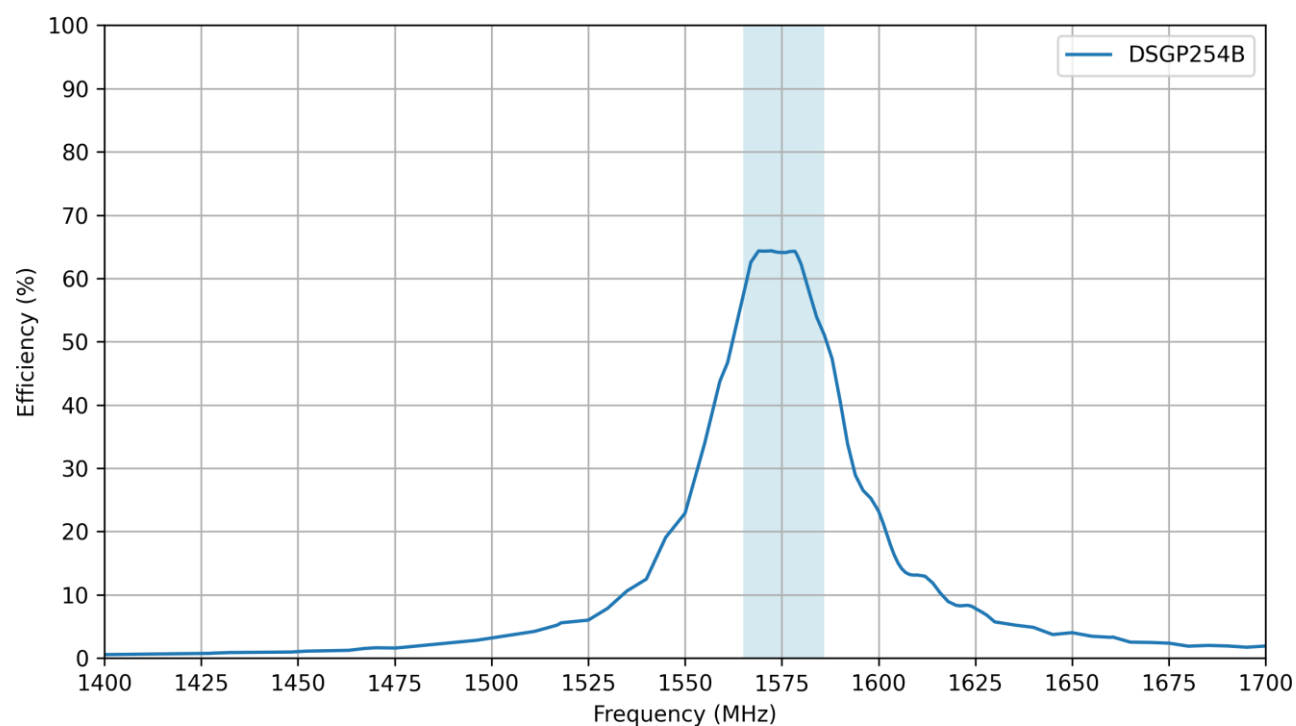
6.2 Return Loss



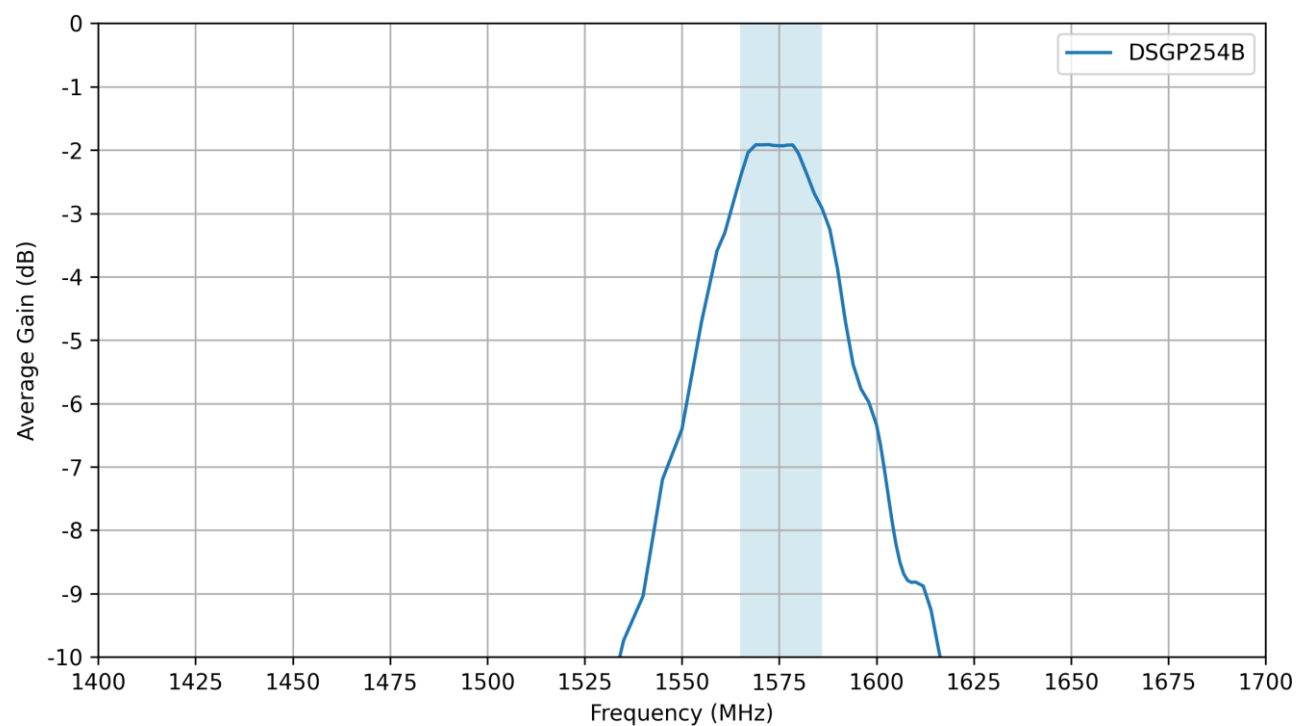
6.3 VSWR



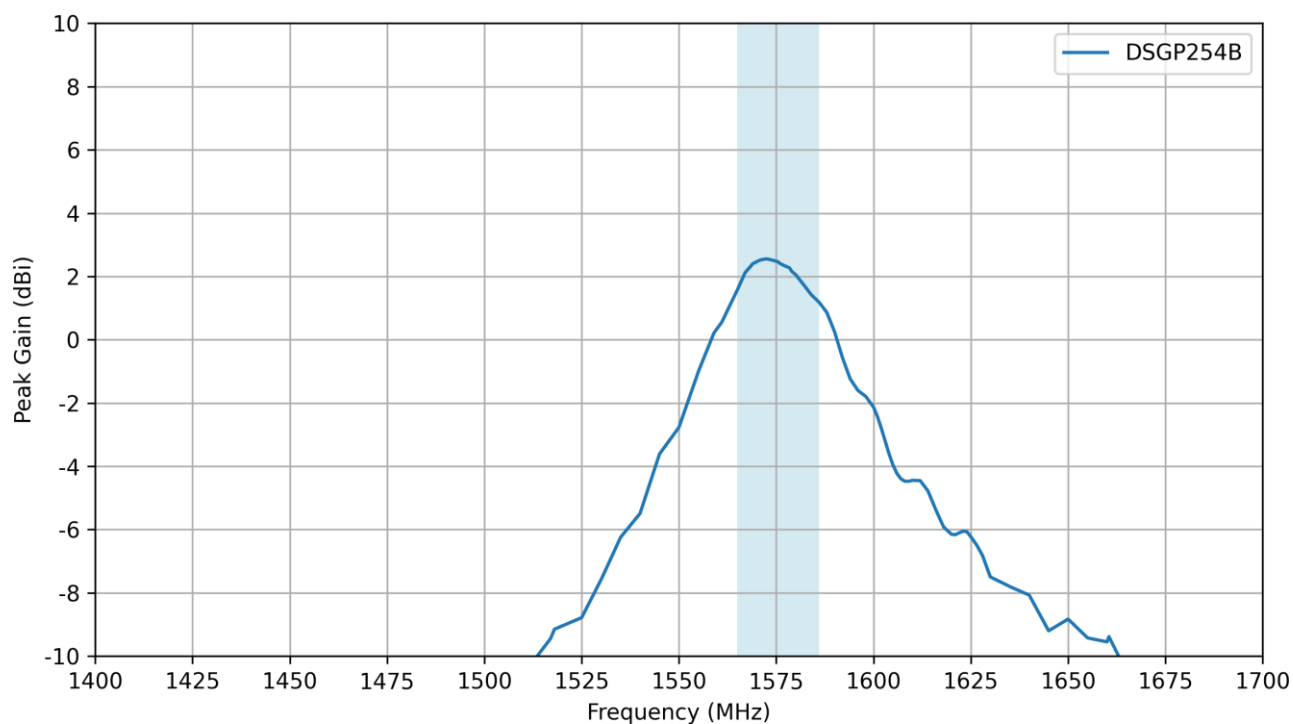
6.4 Efficiency



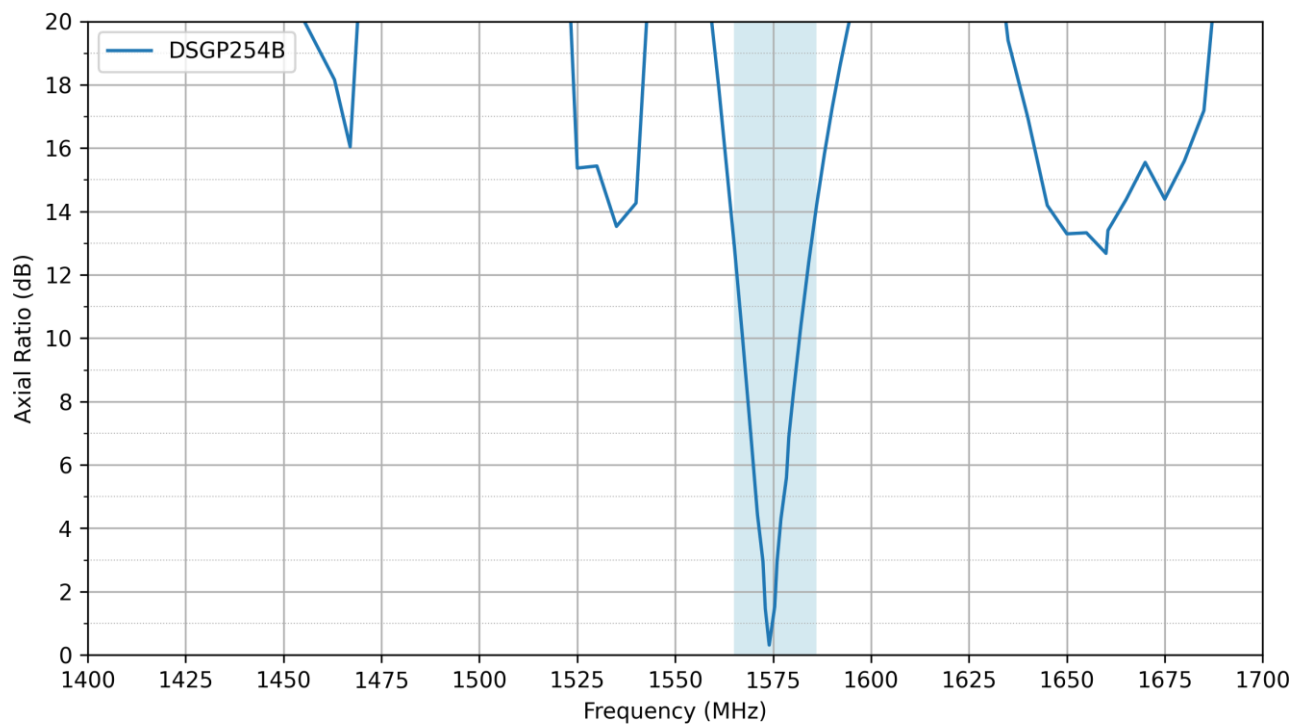
6.5 Average Gain



6.6 Peak Gain

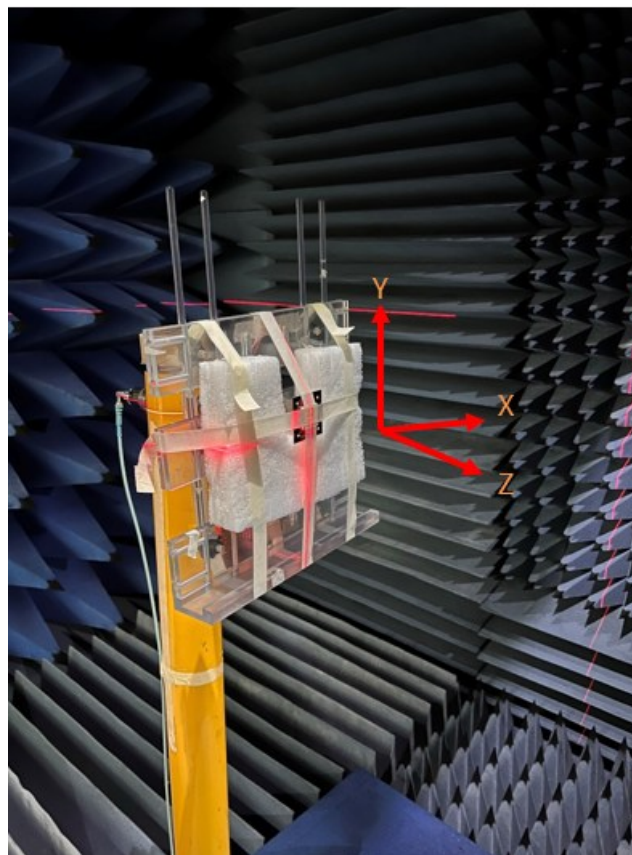
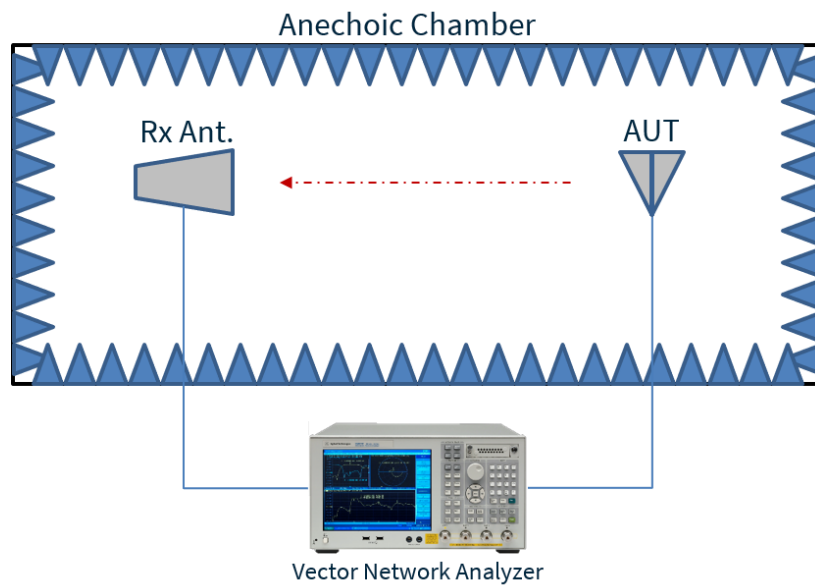


6.7 Axial Ratio



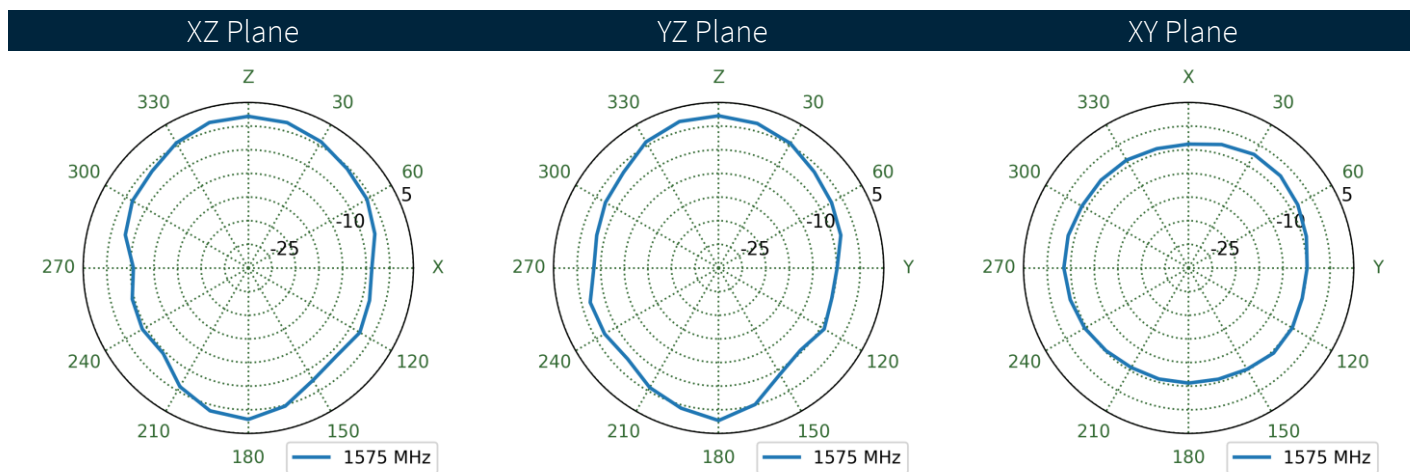
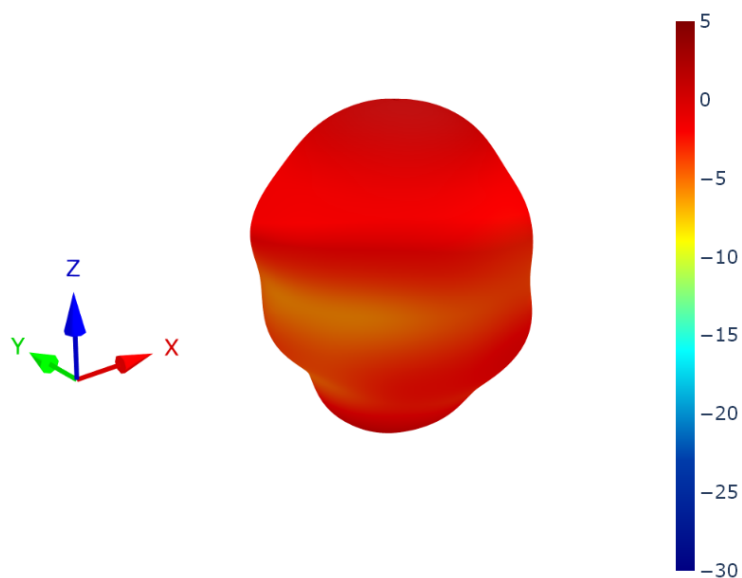
7. Radiation Patterns

7.1 Test Setup



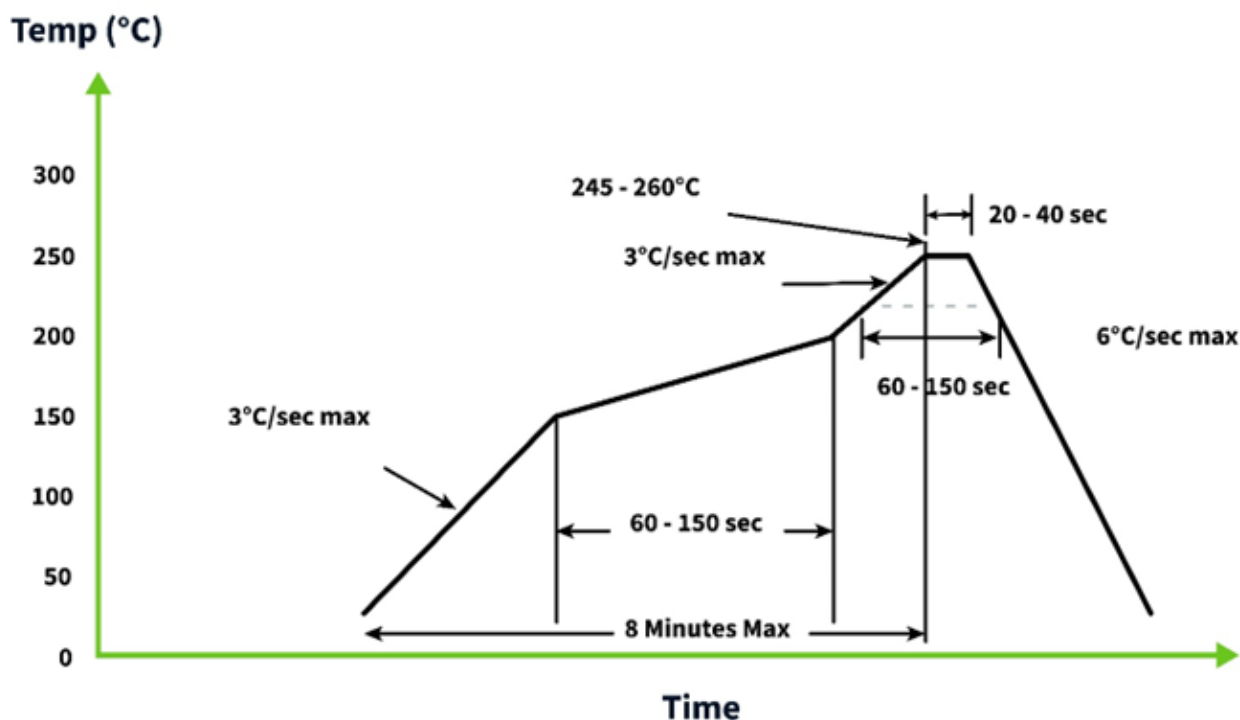
Chamber Test Set-up

7.2 Patterns at 1575 MHz



8. Solder Reflow Profile

The DSGP254B can be assembled by following the recommended soldering temperatures are as follows:



*Temperatures listed within a tolerance of $\pm 10^{\circ}\text{C}$

Smaller components are typically mounted on the first pass, however, we do advise mounting the DSGP254B when placing larger components on the board during subsequent reflows.

Note: Soldering flux classified ROL0 under IPC J-STD-004 is recommended.

Changelog for the datasheet

SPE-25-8-118 – DSGP254B

Revision: A (Original First Release)	
Date:	2025-04-07
Notes:	Initial Release
Author:	Gary West



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